

Contact persons

**Lectures** are translated through the **Zoom**:

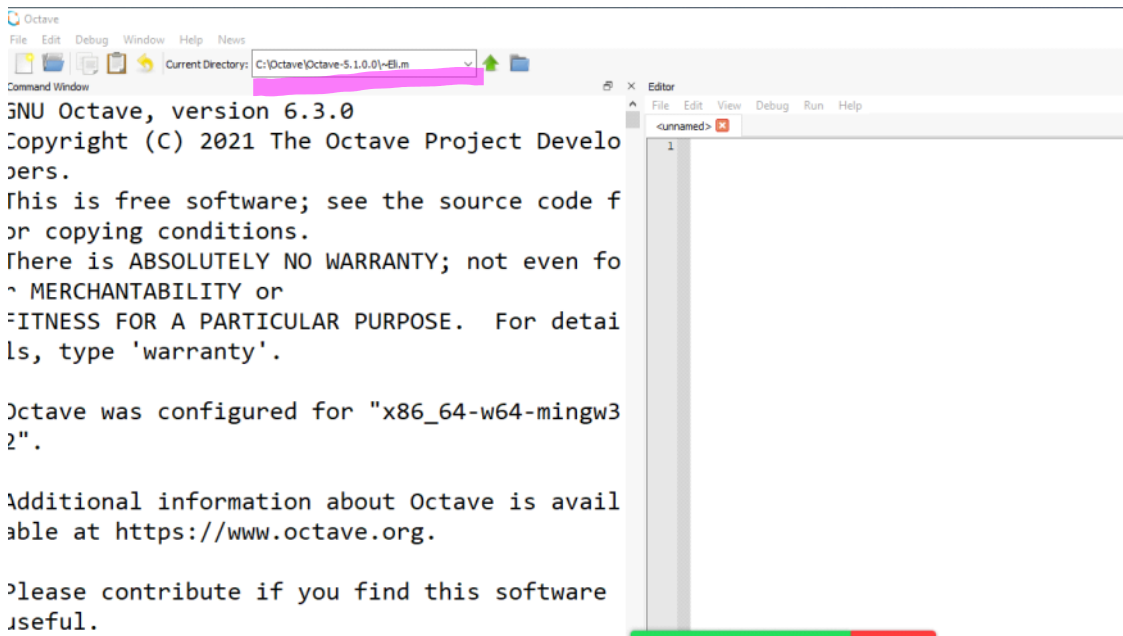
<https://liedm.zoom.us/j/9999112448>

Passcode: **12345678**

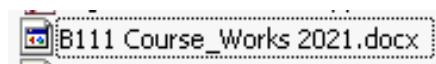
<http://crypto.fmf.ktu.lt/>

<http://crypto.fmf.ktu.lt/xdownload/>

- [octave-6.3.0-w64-installer.exe](#)
- [11-Octave\\_Stud\\_2021.11-Updated.7z](#)



Course Works



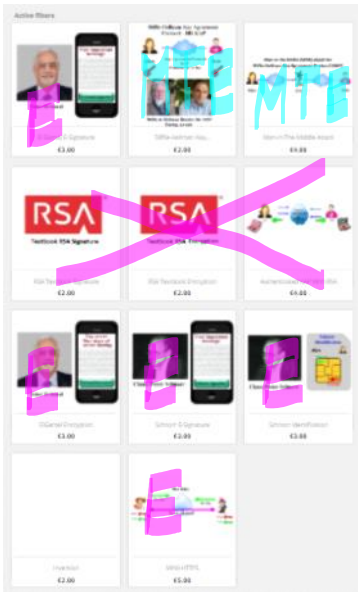
**Midterm Exam, Exam.**

<https://imimsociety.net/en/>

<https://imimsociety.net/en/16-intellect>


<https://imimsociety.net/en/14-cryptography>

You must purchase **only one** problem at a time



You must solve this problem and [Get reward] --> Your account --> OTDER HISTORY AND DETAILS -->

Here are the orders you've placed since your account was created.

| Order reference | Date       | Total price | Payment        | Status           | Invoice  |
|-----------------|------------|-------------|----------------|------------------|--|
| KTWXUNJO        | 01/24/2022 | €0.00       | Knowledge Bank | Payment accepted |  <a href="#">Details</a><br><a href="#">Reorder</a> |

### Moodle:

### E-mails.

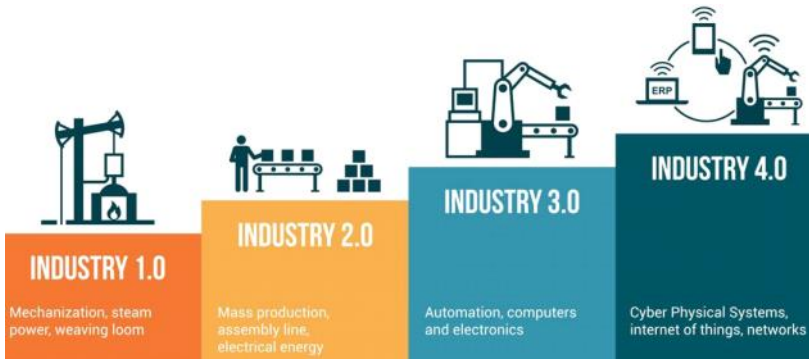


Sakalauskas Eligijus  
B111 Exam

Sakalauskas Eligijus

Subject

Text.  
Name. Surname,  
Group.



*Claus Schwab*



<https://www.burning-glass.com/>

<https://www.burning-glass.com/wp-content/uploads/2020/12/Skills-of-Mass-Disruption-Report.pdf>

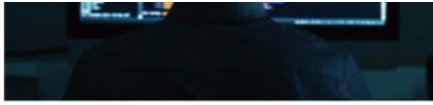
**Skills-of-Mass-Disruption-Report.pdf**

**Skills of Mass Disruption Technologies  
Igdžiai Masinio Virsmo Technologijose**



Solutions





## Skills of Mass Disruption

To help organizations pinpoint disruptive tech skills, Burning Glass Technologies analyzed more than 17,000 unique skills demanded across our database to identify the top 10 most disruptive skills in tech.

**Fintech:** Skills related to technologies such as **blockchain** and others aimed at making **financial transactions more efficient and secure**.

<https://www.burning-glass.com/research-project/skills-mass-disruption/>

Organizations and technology executives know they must adopt new technologies to remain competitive. To help organizations pinpoint the disruptive technology skills that they can begin planning for today, Burning Glass Technologies analyzed more than 17,000 unique skills demanded across our database of over 1 billion historical job listings to identify the top 10 most disruptive skills in tech.

Some of the key findings from *Skills of Mass Disruption* are:

- **Many disruptive tech skills are already in demand and growing fast.** In the past 12 months there were 1,714,483 U.S. job openings requesting at least one of the disruptive skill areas. Over the next five years, they are projected to grow between 17% and 135%. The skill areas projected to grow the fastest include Quantum Computing and Connected Technologies, with forecasted growth rates of 135% and 104%, respectively.

- **These skill areas are spreading across many different occupations and industries.** Eight of the 10 skill areas are already commonly requested in over 30% of occupations. None of the skill areas except Quantum Computing have more than 40% of demand concentrated within one industry. This diffusion of skills across different jobs and industries is hybridizing many roles and teams, requiring employers to be thoughtful in determining which roles are best suited for embedding these skills.

- **Organizations with future-ready skills create future-ready solutions.** The most disruptive organizations are more likely to request the disruptive tech skills. Across all IT and R&D occupations, Unicorn employers – i.e., startups valued at \$1 billion or more – are 33% more likely to request disruptive tech skills than legacy firms in the Fortune 100. This underscores a key maxim: future-ready teams create future-ready solutions.

- \* **Employers have to pay more to hire workers with these skill areas.** The average salary premiums for the disruptive skills areas range between \$4,200 to \$25,000. The two skill areas with the greatest average salary premiums – IT Automation and AI and Machine Learning – are both focused on automating existing tasks to become more efficient. This means many employers face a Catch-22: They need disruptive skills to remain future-ready and gain efficiencies, but they may not be able to afford hiring individuals from a limited pool of existing workers with these skills.

- \* **But employers have realistic options for upskilling current workers to meet the need.**

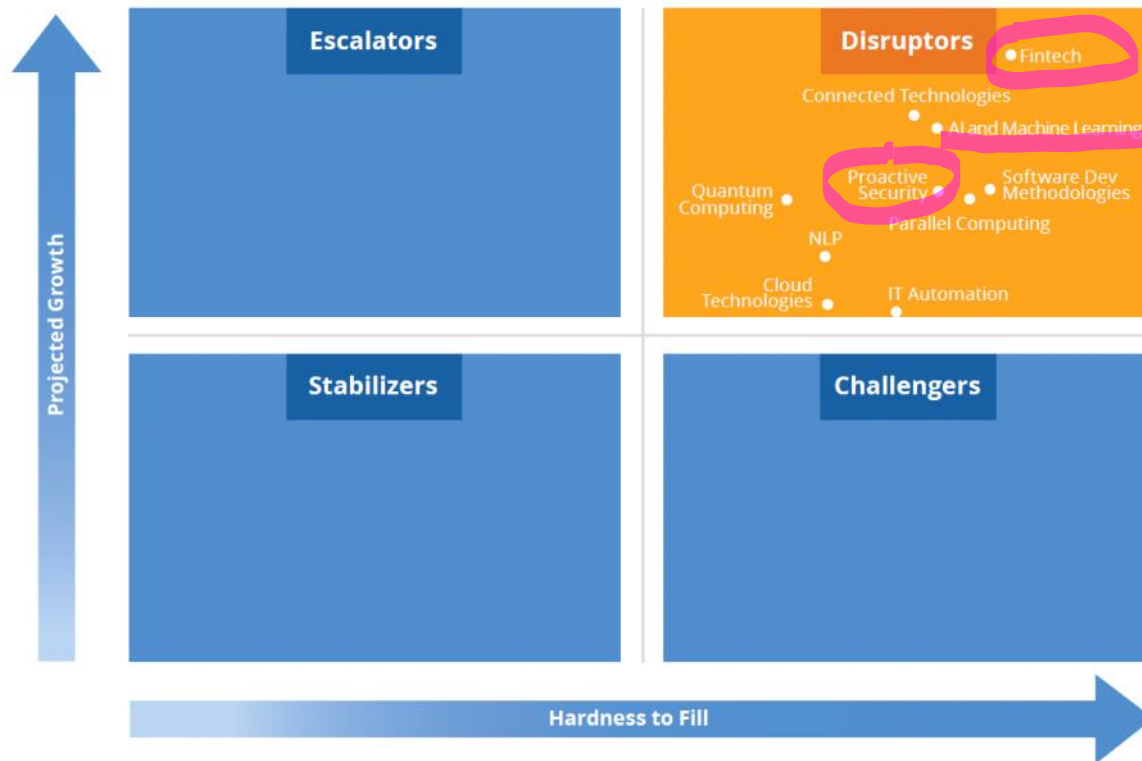
By identifying existing employees in “adjacent roles” that have similar skill sets, employers may be able to strategically reskill and upskill to meet the need at less cost. For all but two of these skill areas, there are at least 200 occupations that represent strong candidates for upskilling. The two remaining skill areas, Parallel Computing and Quantum Computing, are both highly technical

fields, but there are still numerous adjacent roles that can be upskilled for each.

In order to identify the most disruptive skills in tech, we analyzed over 17,000 unique skills demanded across Burning Glass's database of over one billion historical job listings. We grouped similar technology skills into related skill areas and assessed both the projected growth of each skill area over the next five years as well as each skill area's hardness to fill — a composite measure of the average time it takes to fill jobs requesting each skill, as well as the average cost premium to fill each skill. This allowed us to plot skills within Burning Glass's disruptive skills matrix — a methodology previously developed for Quant Crunch: How the Demand for Data Science Skills is Disrupting the Job Market, a joint report with IBM and the Business-Higher Education Forum.

The disruptive skills matrix classifies skills within one of the following four quadrants:

- + **Stabilizers** are skills with low projected growth and low hardness to fill. These skills are typically plentiful across the market but may still be important to key roles.
- + **Escalators** are skills with high projected growth but low hardness to fill. These are high-growth skills that are important to building a future-ready workforce but are typically common across the job market.
- + **Challengers** are skills with low projected growth and high hardness to fill. These are skills associated with established fields that provide strong value, but there is a limited pool of talent.
- + **Disruptors** (proveržio???) are skills with high projected growth and high hardness to fill. These are high-value skills that help firms differentiate their workforce and become future-ready – but are also the hardest for employers to find in the job market.



To narrow the list down to the top 10 most disruptive skill areas in tech, we then ranked each skill in the Disruptors category by summing their normalized projected growth, average salary premiums, and average time to fill. The 10 skills with the highest aggregate scores were selected as the 10 most disruptive skills in tech. These skills include the following:

- + **AI and Machine Learning**: Skills related to developing and utilizing programs, tools, and solutions powered by algorithms and other technologies that automatically respond and improve based upon prior experience or data.
- + **Cloud Technologies**: Skills related to developing, implementing, and securing cloud computing infrastructure and strategy.
- + **Connected Technologies**: Skills related to the Internet of Things and connected physical tools, as well as the telecommunications infrastructure needed to enable them, such as 5G.
- + **Fintech**: Skills related to technologies such as **blockchain** and others aimed at making **financial transactions more efficient and secure**.
- + **IT Automation**: Skills related to automating and orchestrating digital processes and workflows.
- + **Natural Language Processing (NLP)**: Skills related to developing solutions and technologies build upon machine-enabled processing of natural language.
- + **Parallel Computing**: Skills related to a form of computation where many calculations, or the execution of computational processes, are carried out simultaneously.
- + **Proactive Security**: Skills related to proactively securing and protecting digital infrastructure from cybercriminals and preventing cyberattacks before they occur.
- + **Quantum Computing**: Skills related to building and utilizing quantum computers and their applications.
- + **Software Development Methodologies**: Skills related to Agile, DevOps, and related approaches to developing software more rapidly, effectively, and securely.

Many disruptive tech skills are already in demand and growing fast  
 In the past 12 months (December 2019-November 2020) there were 1,714,483 job postings

requesting at least one of the disruptive skill areas. This already represents sizable demand throughout the market, and this level of sustained employer need is especially impressive given the market-wide decline in postings due to the COVID-19 pandemic. But these skills are still maturing and are poised to continue growing at a rapid pace. Over the next five years, each skill is projected to grow at least 17%, and some are projected to grow considerably faster. The skill areas projected to grow the fastest include Quantum Computing and Connected Technologies, with forecasted growth rates of 135% and 104%, respectively.

Table 1: Job Openings and Growth by Disruptive Skill Area.

**Table 1: Job Openings and Growth by Disruptive Skill Area**

| Skill Area                 | Total Job Openings (Last 12 Months) | Projected 5-Year Demand Growth |
|----------------------------|-------------------------------------|--------------------------------|
| Software Dev Methodologies | 634,660                             | 35%                            |
| Cloud Technologies         | 462,963                             | 28%                            |
| Proactive Security         | 373,123                             | 39%                            |
| IT Automation              | 282,380                             | 59%                            |
| AI and Machine Learning    | 197,810                             | 71%                            |
| Connected Technologies     | 68,313                              | 104%                           |
| NLP                        | 36,941                              | 41%                            |
| Fintech                    | 35,667                              | 96%                            |
| Parallel Computing         | 11,056                              | 17%                            |
| Quantum Computing          | 2,718                               | 135%                           |

2020

**Table 3: Average Salary Premium by Disruptive Skill Area**

| Skill Area                 | Average Salary Premium |
|----------------------------|------------------------|
| IT Automation              | \$24,969               |
| AI and Machine Learning    | \$14,175               |
| Fintech                    | \$13,799               |
| Software Dev Methodologies | \$13,762               |
| Connected Technologies     | \$10,873               |
| Cloud Technologies         | \$10,588               |
| Proactive Security         | \$8,851                |
| Parallel Computing         | \$7,797                |
| NLP                        | \$6,368                |
| Quantum Computing          | \$4,204                |

**Table 2. Share of All Occupations Commonly Requesting Disruptive Skill Areas**

| Skill Area                 | Share of Occupations Commonly Requesting Skill Area: (Dec. 2019-Nov. 2020) | Share of Occupations Commonly Requesting Skill Area: 2015 |
|----------------------------|--|---|
| Proactive Security         | 64%  | 57%   |
| Cloud Technologies         | 58%  | 55%   |
| Software Dev Methodologies | 57%  | 53%   |
| AI and Machine Learning    | 56%  | 37%   |
| Connected Technologies     | 41%  | 25%   |
| NLP                        | 35%  | 27%   |
| IT Automation              | 34%  | 16%   |
| Fintech                    | 33%  | 13%   |
| Parallel Computing         | 10%  | 12%   |
| Quantum Computing          | 4%   | 1%  |

Figure 3: Demand for Disruptive Tech Skills by Industry Sector

|                                   | AI and Machine Learning | Cloud Technologies | Connected Technologies | Fintech | IT Automation | NLP | Parallel Computing | Proactive Security | Quantum Computing | Software Dev Methodologies |
|-----------------------------------|-------------------------|--------------------|------------------------|---------|---------------|-----|--------------------|--------------------|-------------------|----------------------------|
| Professional Services             | 25%                     | 31%                | 29%                    | 40%     | 32%           | 28% | 22%                | 28%                | 76%               | 31%                        |
| Finance and Insurance             | 17%                     | 14%                | 4%                     | 30%     | 18%           | 22% | 5%                 | 24%                | 3%                | 20%                        |
| Information / IT                  | 13%                     | 19%                | 26%                    | 11%     | 17%           | 14% | 10%                | 7%                 | 6%                | 12%                        |
| Manufacturing                     | 15%                     | 8%                 | 14%                    | 3%      | 11%           | 7%  | 26%                | 11%                | 2%                | 12%                        |
| Retail Trade                      | 8%                      | 7%                 | 6%                     | 3%      | 4%            | 7%  | 10%                | 3%                 | 2%                | 5%                         |
| Administrative Services           | 3%                      | 6%                 | 3%                     | 6%      | 6%            | 4%  | 3%                 | 5%                 | 0%                | 5%                         |
| Educational Services              | 5%                      | 2%                 | 1%                     | 1%      | 2%            | 5%  | 7%                 | 3%                 | 8%                | 1%                         |
| Health Care and Social Assistance | 5%                      | 3%                 | 11%                    | 1%      | 2%            | 4%  | 3%                 | 4%                 | 0%                | 3%                         |
| Public Administration             | 3%                      | 3%                 | 1%                     | 2%      | 3%            | 3%  | 2%                 | 8%                 | 1%                | 3%                         |
| Transportation and Warehousing    | 2%                      | 2%                 | 1%                     | 1%      | 1%            | 1%  | 2%                 | 1%                 | 0%                | 2%                         |
| Other Industries                  | 4%                      | 6%                 | 4%                     | 2%      | 4%            | 6%  | 10%                | 5%                 | 1%                | 5%                         |

IBM Hyperledger Fabric (HF)  
Maersk Renault

Employers have to pay more to hire workers with these skill areas.

**Disruptive skills** are disruptive for a reason: They are **high value and not everyone has them**.

Not surprisingly, this puts significant upward pressure on salaries. On average, the disruptive skill areas come with salary premiums ranging between \$4,200 and \$25,000. The two skill areas with the greatest average salary premiums – IT Automation and AI and Machine Learning – are both focused on automating existing tasks to make them more efficient. This means many employers face a Catch-22: They need disruptive skills to remain future-ready and gain efficiencies, but they may not be able to afford hiring individuals from a limited pool of existing workers with these skills.

But employers have realistic options for upskilling current workers to meet the need.

To combat the increased cost and difficulty of filling positions with the disruptive skill areas, employers can build these skills within their workforce more efficiently by strategically



reskilling and upskilling existing employees who already perform work using similar skills. For all but two of these skills, there are at least 200 occupations that represent strong candidates for upskilling in these fields, as determined by analyzing roles in which each skill can both align with existing responsibilities and typically comes with a significant salary premium. The two remaining skill areas, **Parallel Computing** and **Quantum Computing**, are both **highly technical fields**, but there are still numerous roles that can be upskilled in each skill area. Organizations can, therefore, more rapidly and effectively integrate these disruptive skills into their teams by upskilling existing employees, rather than relying solely on new hires to fill gaps in their capabilities.

**Table 4: Upskilling Opportunities by Disruptive Skill Area**

| Skill Area                 | Number of Occupations Representing Strong Upskilling Candidates* |
|----------------------------|--|
| Proactive Security         | 598  |
| Software Dev Methodologies | 544  |
| Cloud Technologies         | 524  |
| AI and Machine Learning    | 512  |
| Connected Technologies     | 313  |
| Fintech                    | 311  |
| IT Automation              | 282  |
| NLP                        | 226  |
| Parallel Computing         | 67   |
| Quantum Computing          | 10   |

## 4. Implications and Recommendations

### Employers

- + **Make Developing Disruptive Skills a Priority, Based Upon Your Strategic Goals.** Teams with future-ready skills build future-ready solutions. Therefore, it is imperative for organizations to determine which disruptive skills are most important for them to integrate into their teams to support their current and future strategic priorities. Firms can also take inspiration from disruptive newcomers – such as Unicorns – to understand how these skills can help them build next-generation solutions.
- + **Break Down Silos to Build a Future-Ready Workforce.** Many roles are hybridizing and demand emerging tech skills, even when on non-technical teams. This requires leaders across teams to collaborate on developing a workforce with the skills needed to thrive. Since tech is often the driver of workforce hybridization, the IT and HR (Human Resources) departments make natural bedfellows in many strategic workforce planning endeavors.
- + **Invest in Your Workers with Targeted Upskilling.** Hiring workers who already have disruptive skills is costly and can take a long time. Upskilling and reskilling workers in adjacent roles can reduce the cost and time it takes to build a future-ready team, while also supporting employee retention and advancement.

### Students and Job Seekers

- + **Identify and Learn High-Value Disruptive Skills.** The disruptive tech

skills are growing rapidly and can lead to significant salary boosts. Individuals who identify and develop these future-ready skills – and continuously update their skill sets as new needs emerge – will be best-positioned to enhance their career prospects, both in tech and beyond.

## **Training Providers**

### **+ Incorporate Disruptive Skills into Existing Programs.**

The job market is changing much faster than most curricula. Students who graduate with future-ready skills are best positioned to thrive in the job market, and training providers can ensure they leave school with these skills by incorporating them into existing programs. This includes both tech programs and other disciplines, where workers in nontechnical fields can benefit by building a hybrid skill set combining emerging tech skills and other competencies.

### **+ Build Short-Term Programs to Teach Disruptive Skills to Working Learners.**

Many existing workers will be looking to continuously upskill in emerging fields. Training providers can support them by building short-term training programs specifically tailored to workers and individuals looking to enhance their abilities in new fields in order to improve their employment prospects.

### **+ Communicate the Value of Disruptive Skills.**

The disruptive tech skills can be highly lucrative for individuals who possess them. Training providers can motivate students to learn these skills by communicating the value they confer, in terms of both increased salaries and increased employment opportunities. This will also encourage students to enter and remain within programs dedicated to teaching these emerging, high-value skills.

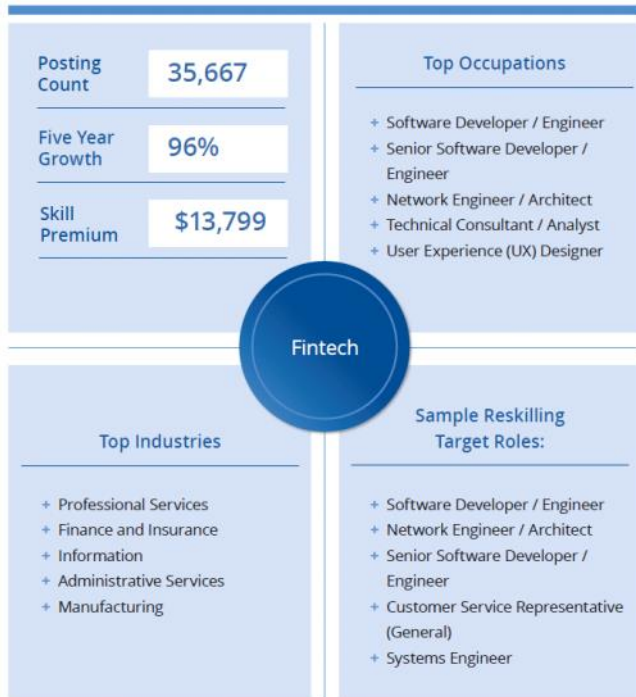
## **Technology Vendors**

### **+ Build a Community of Disruptors.**

To build a large user base for a disruptive solution, you need to educate workers in the skills needed to use it.

Communicating the value of learning these disruptive skills to students and workers – while also providing the resources needed to help them build these skills – can dramatically expand your pool of potential users.

## **Fintech**



## CRYPTOGRAPHY

Euronews 17-03-2015 15-38 CET \_150316\_HTSU\_121B0-172837\_E

<http://crypto.fmf.ktu.lt/xdownload/>

*RAP - KAP*

[Euronews 17-03-2015 15-38 CET \\_150316\\_HTSU\\_121B0-172837\\_E.mp4](http://euronews.com/17-03-2015-15-38-CET-150316-HTSU-121B0-172837-E.mp4)

*Smart Id*

Identification from the Bank' side: certificate recognizable in User's browser.

*Ve r sign*

Weak identification on the User's side.

Public Key Infrastructure - PKI + Biometrics

Diagram

<https://imimsociety.net/en/>

<https://www.facebook.com/IMIMSociety-776869965820856/>

<https://imimsociety.net/en/home/15-wolf-goat-and-cabbage-transfer-across-the-river-algorithm.html>

### Atsiskaitymas:

1. Išspręsti uždaviniai iš <https://imimsociety.net/en/>.
2. Paruošta Kursinio Darbo ataskaita (be sutapties analizės), pranešimo skaidrės, standinis pranešimas.
3. Žodžiu ant lentos atsakyti du klausimai: vienas iš IMIMS uždavinių, kitas iš kurso.

<http://crypto.fmf.ktu.lt/xdownload/>

- [EuroNews\\_2019.01.23\\_11 Carlos.Moedas\\_Davos\\_Day 2.mp4](#)

Quantum computers → *compromizes traditional cryptography*

P vs NP :  $P = NP$        $P \neq NP$

### Blockchain

*For monitoring and control business processes.*

<https://onlineprogrammes.sbs.ox.ac.uk/presentations/lp/oxford-blockchain-strategy-programme/?ef id=c:355184111442 d:c n:g ti:kwd-296270282059 p:k:cryptocurrency m:e a:61795563965 &gclid=Cj0KCQIAmsrxBRDaARIsANyiD1rST3aJzQINrHxPs0oylVh8VAwoZ49Qo3zISI664JR JXZ5xgab4CJAaAkIVEALw wcB&gclsrc=aw.ds>



## Oxford Blockchain Strategy Programme

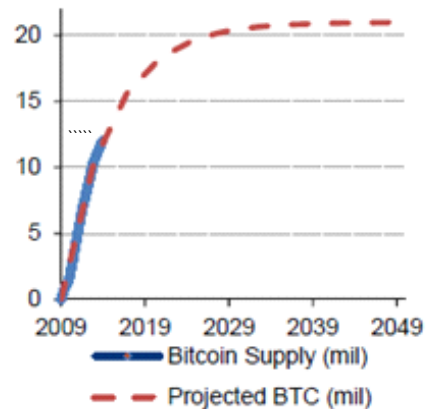
*Discover how blockchain is changing business and how you can harness disruption*

<https://coinmarketcap.com/>

Bitcoin - BTC      <https://bitcoin.org/en/>

Ethereum - ETH      <https://ethereum.org/>

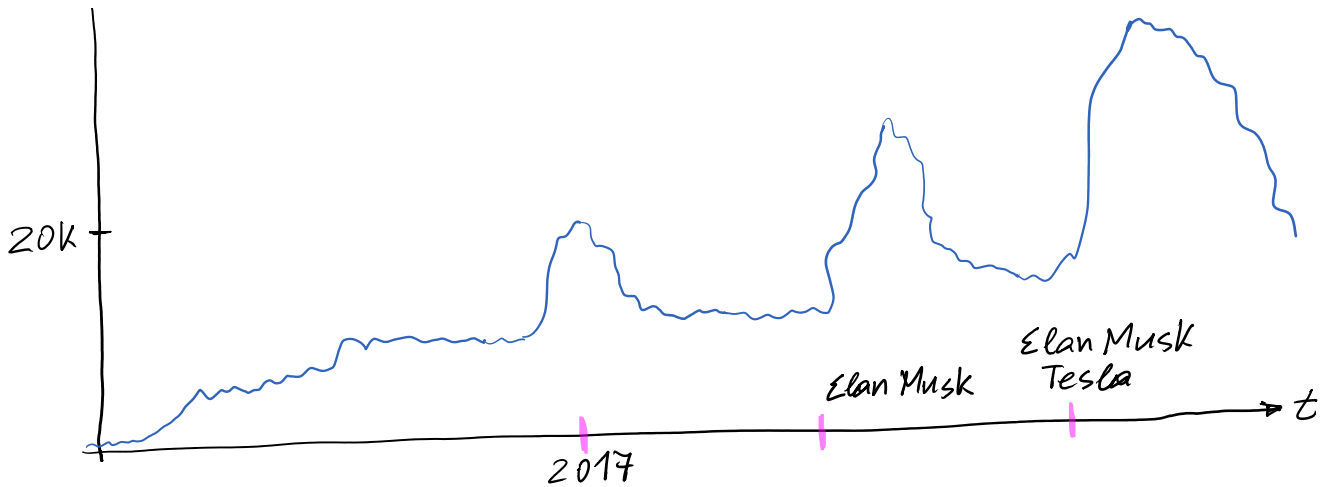
Monero      <https://www.getmonero.org/>



Total number of Bitcoins over time.

*Value* ↑





Ethereum: Consensus mechanism.  
 Vitalik Buterin (Canada) PoW → PoS



Smart contracts & Tokens:

ICO  
 STO → Investment mechanism  
 NFT

Till this place

Turing complete programming language

IoT → Plants →



Temos:

- Kriptografija: šifravimas, e-parašas, identifikacija internete, duomenų integralumas.
- Bitcion'as: nauja pinigų era, technologija, saugumas, socialinė įtaka, kasyba, vertės sukūrimas.
- Kripto valiutos: technologija, įvairovė ir egzotika, saugumas, panaudojimo įvairovė, t.t.
- Bloky grandinės: e-dokumentai, patikima ekonominė ir socialinė veikla, t.t.
- Daiktų Internetas: technologija, ateities gamyklos, globalizacija, 5G ir 6G internetas.
- Išmanieji Kontraktai: technologija, panaudojimas.

Topics:

Cryptography: encryption, e-signature, identification in internet, data integrity.

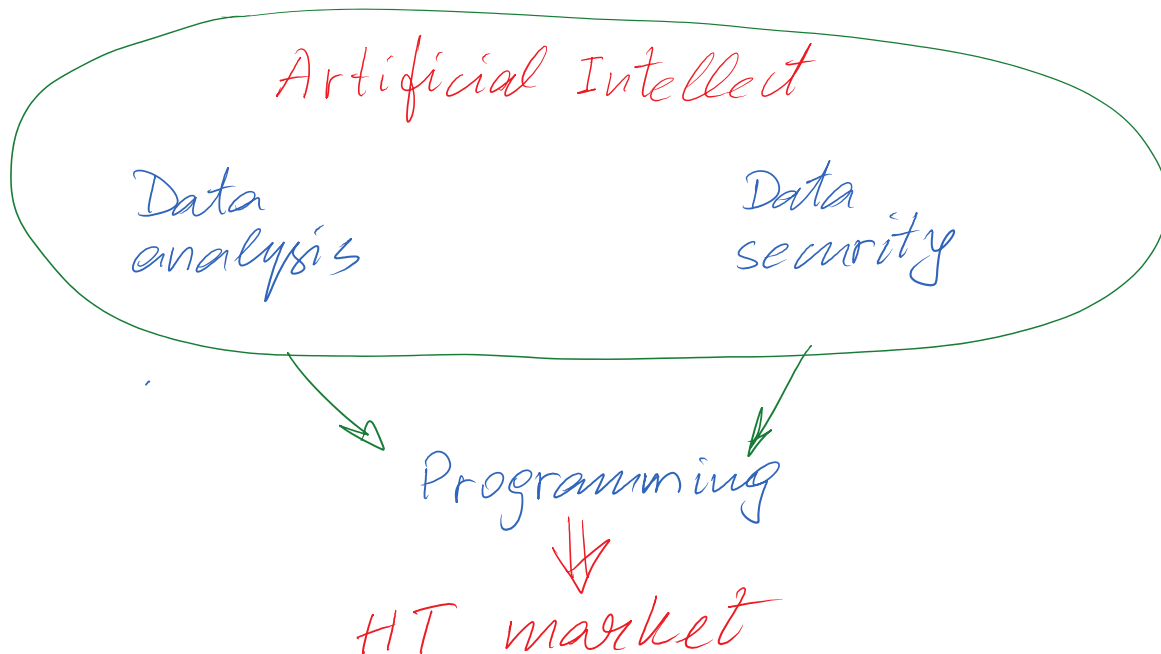
Bitcoin: new age of money, technology, security, social impact, mining, value creation.

Cryptocurrencies: technology, diversity and exoticism, security, variety of applications, etc.

Blockchain: e-documents, trusted economical and social activity, etc.

Internet of Things (IoT): technology, future manufactures, globalization, 5G and 6G internet.

Smart Contracts: technology, applications.



- <http://crypto.fmf.ktu.lt/> --> Octave tools to learn Cryptography  
--> Study materials  
--> Other downloadable information